

Descriptions of GIS Mine Polygons Used in the Cumulative Impact Study

Tennessee

Original Source Description

The source of the GIS mine polygons for Tennessee used in this cumulative impact study is the a digital geographic database of coal mining permit boundaries in Tennessee produced by the U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement (OSM) in Knoxville, Tennessee. It consists of georeferenced digital map data and descriptive attribute data. OSM Knoxville Field Office Geographic Information System (KFO GIS) Team developed this information from public records. The source for most of these records is the permit application submitted by coal mining operators for review and approval by OSM to conduct surface coal mining operations at specific locations in the State of Tennessee. These materials are a working resource of OSM and are contained in its file rooms and archives in paper format. Data contained in these materials were converted to digital format generally through digitizing paper maps onto a planimetrically correct base.

Selected features from the last approved Mining Operation Plan maps and Environmental Resources maps contained within a permit application submitted by a coal mining operator to the Office of Surface Mining (OSM) were manually digitized into an individual coverage using the ArcEdit subsystem of ArcInfo Workstation. Each map was georeferenced using geographic features found in common on both the paper manuscript (map) and on Digital Raster Graphic (DRG) images of standard 7.5-minute series USGS topographic quadrangle maps as displayed on a computer monitor. These DRG's were acquired from the U.S. Tennessee Valley Authority and were transformed to Tennessee State Plane, NAD 27 coordinate system by OSM. After initial digitizing on a standard digitizing table, the digital data set was inspected on a computer monitor and visually compared against the paper manuscript. Coverage feature classes were edited to correct digitizing errors. Attribute data was added to describe features contained in the coverage. Individual coverages were then posted to the Knoxville Field Office Geographic Information System (KFO GIS). Each individual coverage was then incorporated into a master coverage of similar features. All compilation, digitizing, and quality control were performed by GIS specialists at the OSM in Knoxville, TN.

The accuracy of these digital data is based on features represented on source maps supplied by various coal mining operators. In general, these features were drawn by hand on paper reproductions of standard 7.5-minute series USGS topographic quadrangle maps enlarged to a scale of 1"=400' and were submitted as Mining Operation Plan maps or Environmental Resource maps in a permit application for approval by OSM to conduct surface coal mining operations at a specific location. It is not known whether these paper reproductions of the standard USGS topographic maps meet National Map Accuracy Standards. OSM digitized selected features from each paper source map using a minimum of four georeferenced control point locations (tics). Approximately 95 percent

of the maps resulted in a Root Mean Square (RMS) error of less than 10 feet as reported by the software during calibration. None exceeded 25 feet. The difference in positional accuracy between the actual feature location on the ground and their digitized coordinates as shown in this data set are unknown

This data set is a work-in-progress and represents the current amount of digital data available for this theme at the time of its production. During production, selected paper maps from individual permit applications are digitized in reverse chronological order based on the permit and/or revision approval date. This method is used to ensure that data resulting from the most recently approved permitting action for any given mining operation is always available to KFO GIS users. As the general digitizing effort continues, maps are retrieved from successively older permit applications for digitizing and data entry. Current estimates of temporal coverage for this theme extend back to approximately 1984. As new information is made available to OSM, and as resources are available to capture this information into a digital format, this data set will be amended with updated features from newly approved mining operations and also be revised to include features from older mining operations.

Although these data have been processed successfully on a computer system at OSM, no warranty expressed or implied is made by OSM regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty.

For further information about the coal mining data sets held by OSM, contact Bill Card, Geographer, Office of Surface Mining, Knoxville Field Office, 530 Gay Street SW, Suite 500, Knoxville, TN 37902, telephone 865.545.4103, x. 134, fax 865.545.4111, e-mail bcard@osmre.gov.

Description of Digital Data Base Queried for the Cumulative Impact Study

Staff from OSM's Pittsburgh Office downloaded the most current digital database from Tennessee mining permits from OSM Knoxville Field Office FTP server on September 23, 2002. This database consisted of 816 mining polygons. Staff from the Knoxville Field Office telefaxed a list of new mining permits issued by OSM from January 1992 to date that were approved to use surface mining methods or a combination of surface and underground methods to extract coal. The permits on this list met the criteria established by the EIS Steering Committee for the cumulative impact study and was used to select a subset of mine permit digital data polygons from the source database. Further, using the boundaries of the EIS study area in Tennessee, a GIS specialist at OSM Pittsburgh Office used readily available querying tools in ESRI ARCVIEW software to select only those surface mining permits that were located wholly or partly within the EIS study area. This filtered digital data, which consisted of 39 new surface mines, were forwarded to EPA's Wheeling Office.

Below is a list of digital mining polygons forwarded for inclusion in the cumulative impact study.

Area	Perimeter	Permit	Acres	Issued	Type	Permittee
30465400	41338.5	2846	699.39	19930629	S	Skyline Coal Co.
1035160	6072.51	2853	23.7639	19980319	S	East Fork
1746640	13837.1	2863	40.0974	19940902	S	Hood Coal Corp.
15103300	18107.5	2876	346.724	19920214	S	Skyline Coal Co.
2192200	12866.7	2892	50.3259	19920803	C	Rich Resources I
6163980	24088.8	2904	141.507	19920904	C	Tennessee Consoli
5232260	27300	2905	120.114	19920810	C	Robert Clear Coa
3127850	54218.6	2923	71.8056	19960109	S	Round Mountain M
5937830	13173.5	2927	136.314	19931002	S	Tennessee Consol
5590310	26912.8	2929	128.34	19930507	C	Robert Clear Coa
9672760	25563.8	2931	222.056	19940914	C	Gatliff Coal Co.
3474050	20565.2	2938	79.7532	19950331	S	Tennessee Consol
5795880	28318.9	2944	133.059	19940520	C	Robert Clear Coa
21139800	143268	2947	485.303	19951023	C	Gatliff Coal Co.
14015400	99090	2951	321.75	19960911	S	Premium Coal Co.
7915880	42381.8	2952	181.724	19950804	S	Hood Coal Corp.
4861450	16927.3	2953	111.604	19961025	S	Gatliff Coal Co.
12050700	63882.9	2955	276.645	19971110	S	Gatliff Coal Co.
49239200	160020	2956	1130.38	19951016	S	Tennessee Mining
4482470	26429.7	2957	102.903	19960126	C	Tennessee Consol
41457200	31645.1	2959	951.727	19970403	S	Skyline Coal Co.
25640600	23207.6	2981	588.627	19970911	S	Cumberland Coal
6050420	16749.5	2982	138.899	19970507	S	Tennessee Consol
3565400	30569.4	2983	81.8494	19960423	S	Robert Clear Coa
16370900	49242.5	2990	375.825	19970102	S	Addington Enterp
26786700	65574.6	2994	614.939	19960912	S	Addington Enterp
17007500	97312.6	3005	390.439	19970326	S	Robert Clear Coa
31883600	111662	3008	731.947	19970728	C	Additngton Enter
24616600	139962	3010	565.12	19980127	A	Tennessee Mining
2648310	13755.2	3013	60.7968	19980304	A	Tennessee Consol
12745900	43582.5	3015	292.605	19980509	A	Appolo Fuels Inc
6018640	51569.3	3045	138.169	19980811	A	Appolo Fuels Inc
9653380	46303.8	3048	221.609	19990401	A	Robert Clear Coa
36521400	113165	3054	838.414	20000815	A	Appolo Fuels Inc
15718800	83907.7	TN-005	360.854	19930107	C	Gatliff Coal Co.
23922900	112234	3058	549.194	20001114	A	Mountainside Coa
15811500	102234	3059	362.983	20010801	A	Mountainside Coa
10227800	33875.4	3052	234.798	20010607	A	Mountainside Coa
12017900	73438.7	2865	275.892	19920124	C	Gatliff Coal Co.